

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Canceled) A system for restoring normal body temperature to a patient, said system comprising: an intravascular catheter having at least one heat transfer surface; a temperature sensor; and a control unit connectable to the temperature sensor and the catheter for selectively transferring heat to and from the at least one heat transfer surface to maintain normal body temperature.
2. (Canceled) A system as in claim 1, wherein the catheter includes at least a heat-generating surface and a separate heat-absorbing surface.
3. (Canceled) A system as in claim 2, wherein the heat-generating surface comprises a resistance heater and the heat-absorbing surface comprises a metal foil wrapped around the catheter.
4. (Canceled) A system as in claim 3, wherein the resistance heater comprises a coil and the metal foil has an exposed area of at least 2 cm.^{sup.2}.
5. (Canceled) A system as in claim 4, wherein the control unit comprises an electrical current source connectable to the resistance heater and a thermoelectric cooler connectable to the metal foil.
6. (Canceled) A system as in claim 1, wherein the catheter includes at least one flow lumen which permits flow of a heat exchange medium past the heat transfer surface, and wherein the control unit includes a heater, a cooler, and a controller for selectively activating the heater or the cooler to heat or cool the heat exchange medium and restore normal body temperature to the patient.
7. (Canceled) A system as in claim 6, wherein the heater is an electrical resistance heater and the cooler is a thermoelectric cooler.

8. (Canceled) A system as in claim 1, wherein the temperature sensor is on the catheter and measures blood temperature.
9. (Canceled) A system as in claim 1, wherein the temperature sensor is separately attachable to the patient to measure body temperature.
10. (Canceled) A catheter for restoring normal body temperature to a patient by selectively transferring heat to or from blood flow, said catheter comprising: a catheter body having a proximal end and a distal end which is insertable into a blood vessel; a heat-generating heat exchange surface near the distal end of the catheter; and a heat-absorbing heat exchange surface near the distal end of the catheter.
11. (Canceled) A catheter as in claim 10, wherein the catheter body has a length in the range from 15 cm to 50 cm and a diameter in the range from 1 mm to 5 mm.
12. (Canceled) A catheter as in claim 10, wherein the heat-generating heat transfer surface comprises an electrical resistance heater and wherein the catheter further comprises a connector which connects the electrical resistance heat to an external current source.
13. (Canceled) A catheter as in claim 10, wherein the heat-absorbing heat transfer surface comprises a metal foil wrapped around the catheter body.
14. (Canceled) A catheter as in claim 13, wherein the metal foil extends from near the distal end to near the proximal end of the catheter body and wherein the proximal end of the foil is configured to engage an external cooler.
15. (Canceled) A method for restoring normal body temperature to a patient having a body temperature above or below normal body temperature, said method comprising: selectively

introducing heat to the blood flow for hypothermic patients or removing heat from the blood flow from hyperthermic patients; monitoring a temperature characteristic of the patient; and selectively removing heat through the catheter from the blood flow of initially hypothermic patients if the temperature characteristic indicates that the patient has or will become hyperthermic or introducing heat through the catheter to the blood flow of initially hyperthermic patients if the temperature characteristic indicates that the patient has or will become hypothermic.

16. (Canceled) A method as in claim 15, wherein the heat is transferred via a catheter inserted into a blood vessel selected from the group consisting of the femoral artery, the jugular artery, and the jugular vein.

17. (Canceled) A method as in claim 15, wherein the heat introducing steps comprise introducing heat at a rate between 10 W and 250 W.

18. (Canceled) A method as in claim 17, wherein the heat introducing step comprises directing current through a resistance heater near the distal end of the catheter, passing radiofrequency current from the distal end of the catheter through the blood, circulating a heated medium through a heat exchanger near the distal end of the catheter, or directing light energy through a wave guide to the distal end of the catheter.

19. (Canceled) A method as in claim 15, wherein the heat removing steps comprise removing heat at a rate between 1 W and 100 W.

20. (Canceled) method as in claim 19, wherein the heat removing step comprises (a) engaging a proximal end of the catheter against a cooler in order to conductively remove heat from a distal portion of the catheter along a heat conductive path on the catheter and to the cooler or (b) circulating a cooling fluid from the proximal end of the catheter, through a distal portion of the catheter, and back to the proximal end.

21. (Canceled) A method as in claim 15, wherein the temperature characteristic monitoring step comprises monitoring at least one of body temperature and blood temperature.
22. (Canceled) A method as in claim 15, wherein the surface temperature of the heating surface is maintained below 42.degree. C.
23. (Canceled) A method as in claim 15, wherein blood is being heated, wherein heating is stopped when the blood temperature reaches 36.9.degree C.
24. (Canceled) A method as in claim 15, wherein blood is being cooled, wherein cooling is stopped when the blood temperature drops to 36.9.degree C.
25. (New) A system, for controlling a patient's body temperature, the system comprising:
 - a heat exchange catheter having a heat transfer region, said heat transfer region being positionable in contact with the patient's flowing blood to heat or cool the blood;
 - a temperature sensor which generates a signal indicative of the patient's body temperature;
 - a controller which receives the signal from the temperature sensor and, relative to a reference temperature, controls whether the heat exchanger heats or cools, and the amount of heating or cooling of the patient's blood.
26. (New) A system according to Claim 25 wherein the reference temperature is a target temperature to which the patient's body is to be heated or cooled and wherein the controller is a programmable controller adapted to receive an input of the target temperature.
27. (New) A system according to Claim 25 wherein the temperature sensor apparatus comprise a single temperature sensor.

28. (New) A system according to Claim 25 wherein the temperature sensor apparatus comprise a plurality of temperature sensors.
29. (New) A system according to Claim 25 wherein the temperature sensor apparatus comprise at least one temperature sensor located distal to the heat transfer region.
30. (New) A system according to Claim 25 wherein the temperature sensor apparatus comprise at least one temperature sensor located proximal to the heat transfer region.
31. (New) A system according to Claim 25 wherein the temperature sensing apparatus comprises a temperature sensor located such that it senses the temperature of the patient's blood.
32. (New) A system according to Claim 25 wherein the temperature sensing apparatus comprises at least one temperature sensor located proximal to the heat transfer region and at least one temperature sensor located distal to the heat transfer region.
33. (New) A system according to Claim 25 wherein the temperature sensing apparatus comprises at least one temperature sensor coupled to the heat transfer region.
34. (New) A system according to Claim 25 wherein the temperature sensing apparatus comprises a temperature sensor which senses the temperature of the heat exchange region.